NEW RECORD OF PLANTS FROM EASTERN BHUTAN

During a very short survey of the flora in eastern Bhutan the author collected some interesting specimens which were not previously reported from this part of the country. These are as follows :

1. **Ixeris sagittarioides** (Clarke) Stebbins in Journ. Bot. 75 : 50. 1937 ; Babu in Bull. Bot. Surv. Ind. 8(2) : 200. 1966 ; Kitamura, Fl. E. Nepal 140. 1969 ; Hara, Fl. E. Himal. 138. 1971 ; *Lactuca sagittarioides* Clarke, Comp. Ind. 265. 1870 ; Hook. f. Fl. Brit. Ind. 3 : 410. 1881 ; Collet, Fl. Simlen. 285. 1921 ; Atkinson, Fl. Kumaon 516. 1980.

An annual glabrous herb ; leaves radical, 5-30 cm long, 5-8 nerved, petiole 3.5-25 cm long with coriaceous entire wing that narrows downwards. Flowering stems 15-44 cm, slender, sometimes sparsely hairy above, nacked, corymbosely branched above, heads homogamous, 1.5 cm in length and 2 cm in diameter, outer bracts very small 3 mm inner oblong, 6 × 2 mm ; flower 0.5-1.5 cm long, corolla 0.4-1.4 cm, yellow, ligulate, achenes 1 mm including the beak ; pappus 4-6 mm.

Flowering and fruiting : March-May.

Local name : Karnpaati.

Distribution : Himalayas from Dharmshala (H.P.) to Nepal, Bhutan (between 5000-6000 ft), Arunachal and Upper Burma. Specimens have been deposited in the herbarium, Royal Botanic Garden, Kew, England.

2. **Pteracanthus urticifolius** (Kuntze) Bremek. *Strobilanthes alatus* Nees in DC. Prodr. 11 : 194 ; T. Anders in Journ. Linn. Soc. 9 : 476 ; C. B. Clarke in Hook. f. Fl. Brit. Ind. 4 : 464. *S. reflexus* Nees l.c. 194. *S. attenuatus* Nees l.c. 193 (excl. syn.).

A shrub 60-120 cm, erect viscous hairy ; leaves 5-18 cm, upper sessile, lower long petioled, base cordate, rounded or attenuate, serrate, nerves 7-8 pair ; petiole 3-7.5 cm, linear or winged upwards. Spikes (by the early fall of the bracts) form terminal panicles ; upper flowers soon in distant pairs, not capitate ; bracts narrow-lanceolate or oblong, caducous ; upper hardly so long as the calyx ; bracteoles 1.2..cm ; narrowly oblong, caducous, calyx 0.6-1.2 cm, deeply divided ; segments unequal linear, obtuse, green, viscous hairy. Corolla ventricose, mouth curved, constricted base hardly longer than the calyx, 2 hairy lines within. Stamens glabrous, 4 in number, didynamous ovary glandular, style short, very remotely minutely hairy. Capsules 1.8 cm long, narrowly elliptic, glandular hairy, 4 seeded, seeds 0.6 cm, ovate, shaggy ; aerioles hardly any.

This species has not been yet reported from the Bhutan.

Flowering : July-October.

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MINERAL POTENTIALITIES OF LEAF LITTER OF A FEW TREE SPECIES OF INDIAN BOTANIC GARDEN, HOWRAH

In the conservation of the bio-physico-chemical matrix of an environment, the role of mineral components is pivotal. It is usually stressed that in the moist tropical environment a large quantity of valuable mineral are looked up in the leaves and other parts of plant bodies, whereas its soil remains poor in energy material owing to the quick oxidation by high temperature and simultaneous leaching of minerals due to heavy precipitation prevalent under these environments. It is noticed in course of a study in the Indian Botanic Garden, Howrah, West Bengal that its leaf litter is cleared off the soil surface manually. An attempt has been made here to assess the mineral potentialities of a few tree leaf litter (as removed periodically) which if judiciously retrieved, may compensate for the continuous process of loss of minerals from the garden soil system. The studies may help in the individual plant conservation or arboriculture practices where leaf mineral contents can be a pointer to mineral preferences of the plants.

The garden is located on the northern flank of the river Ganga in the district of Howrah. It is situated on the gangetic alluvium of recent origin. Climatically, it falls within the moist subtropics with a mean annual temperature 24°C and mean annual rainfall varying between 135-150 cm.

One composite sample was collected for determining the mineral status of the tree leaf litter of each of *Tectona grandis* Linn. f., *Butea monosperma* (Lamk.) Taub., *Polyalthia longifolia* (Sonner.) Thwaites, *Swietenia mahagoni* (Linn.) Jacq., *Couroupita guianensis* Aubl., *Madhuca indica* J.F. Gmel., *Ficus benghalensis* Linn. and *Dillenia indica* Linn. The samples were air dried, powdered and sieved. The estimation of the ash content was done by the ignition method. The wet digestion procedure was applied for individual mineral analysis. For the sodium and potash determination flame photometer was used. The remaining components were analysed by the standard methods[1].

The mineral compositions of the litter of different tree species are given in table-1. It is evident from the analyses that the ash content is variable, the minimum being 7.5% in *Swietenia mahagoni* to a maximum of 19.8% in *Dillenia indica* within the eight species so far analysed. It is noticeable, further, that the species of *Dillenia indica, Ficus benghalensis, Butea monosperma* and *Tectona grandis* can safely be planted along the dominant saline areas with a view to soil conservation owing to their excellent salt bearing capacities.

The organic carbon (O.C.) status of the leaf litter ranges from a minimum of 34.2% in *Ficus benghalensis* to a maximum of 41.1% in the *Polyalthia longifolia*. It is